

Space and Missile Systems Center



M-Code Benefits and Availability

Capt Travis Mills, SMC/GPEP

29 Apr 15

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 29 APR 2015		2. REPORT TYPE		3. DATES COVERED 00-00-2015 to 00-00-2015	
4. TITLE AND SUBTITLE M-Code Benefits and Availability				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Space Command, Space and Missile Systems Center (SMC/GPEP), Los Angeles AFB, El Segundo, CA, 90245				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Presented at the GPS Partnership Council 2015 (GPSPC15), held April 29 to May 1, 2015, at the Los Angeles AFB, CA.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 6	19a. NAME OF RESPONSIBLE PERSON
a REPORT unclassified	b ABSTRACT unclassified	c THIS PAGE unclassified			



Informational Briefing

SPACE AND MISSILE SYSTEMS CENTER

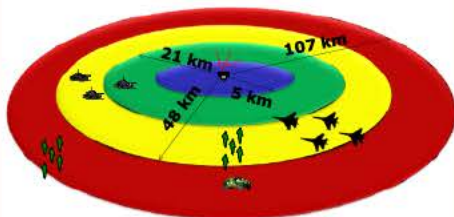
- Operational Benefits of M-Code
- Process for M-Code Delivery and Initial Operations
- M-Code Available for Use Forecast

Operational Benefits of M-Code

SPACE AND MISSILE SYSTEMS CENTER

M-Code Increased Power

Operate closer to jammer, under trees



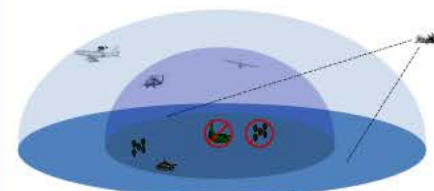
M-Code Jamming Resistance

Initial fix enhanced, anti-jam extended



Blue Force Electronic Attack Compatibility

Operate near friendly jamming



M-Code Cryptography

More secure, more flexible



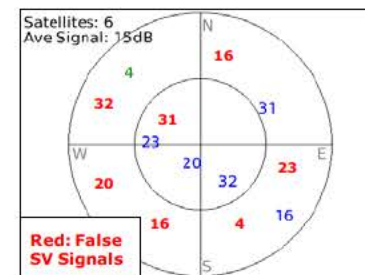
M-Code Key Management

Reduced user burden, improved interoperability



M-Code Anti-Spoof

Detect and reject false signals





M-Code Delivery & Initial Operations

SPACE AND MISSILE SYSTEMS CENTER

- SMC/GP delivers space system, control system, and user equipment assets to support “M-Code Available for Use”
 - M-Code PPS PNT
 - Crypto key OTAD & OTAR
- HQ AFSPC/A3 authorizes “M-Code Early Use” prior to System Capability IOC or FOC
 - M-Code/MNAV SIS operational broadcast prior to Block II EP FOC and GPS III MPO IOC



EP: Electronic Protection
 FOC: Full Operational Capability
 IOC: Initial Operational Capability
 MNAV: Modernized Navigation

MPO: Military Protection & Operations
 MPS: Mission Planning System
 OTAD: Over-the-Air Distribution
 OTAR: Over-the-Air Rekey

PPS: Precise Positioning Service
 PNT: Positioning, Navigation & Time Transfer
 SIS: Signal in Space

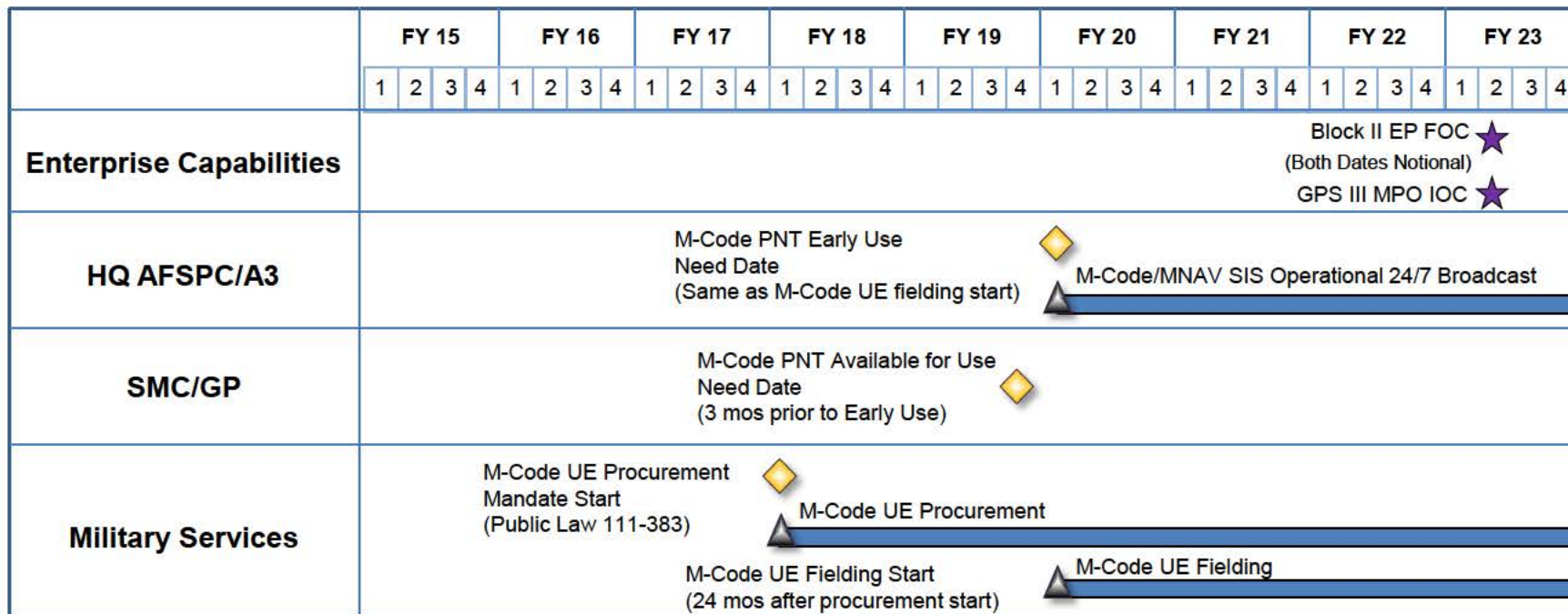
UE: User Equipment



M-Code UE Mandate Driving Need Date

SPACE AND MISSILE SYSTEMS CENTER

- Public Law 111-383 precludes purchasing non-M-Code UE after FY17
- Derived need dates
 - Available for Use delivery: Q4FY19
 - Early Use authorization: Q1FY20
- GPS Directorate exploring alternatives to meet or beat need dates





Summary

SPACE AND MISSILE SYSTEMS CENTER

- M-Code provides significantly improved warfighter benefits
 - Increased power
 - Jamming resistance
 - BFEA compatibility
 - More secure and flexible cryptography
 - Reduced crypto key management burden
 - More robust anti-spoofing
- M-Code PPS PNT expected to be operationally available before FY20